REMARKS

Entry and consideration of this Supplementary Preliminary Amendment are respectfully requested prior to or concurrent with calculation of the filing fees. By this Amendment, Applicants seek to correct inadvertent errors that were just recently discovered.

Examination on the merits is awaited.

Respectfully submitted,
SMITH, GAMBRELL & RUSSELL, LLP

By: _____

Michael A. Makuch, Reg. No. 32,263
1850 M Street, N.W., Suite 800
Washington, D.C. 20036
Telephone: (202) 263-4300
Fax: (202) 263-4329

Date: October 21, 2003

MARKED UP VERSION OF THE SPECIFICATION

Page 9, third paragraph:

The 9th aspect of the present invention is the surface acoustic wave filter according to ~~the 4th~~ the 1st or the 5th aspects of the present invention, wherein the other end of said inductor is connected to a connection portion between said surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter.

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FIG. 2 shows the attenuation characteristic of the surface acoustic wave filter 10, comprising the inductor 1. A ripple 220 in the reception frequency band shown in FIG. 2 is smaller than the ripple ~~210~~ 200, shown in FIG. 29. Consequently, the insertion loss in the reception frequency band has been reduced.

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FIG. 3 is a Smith chart showing the impedance characteristic of the surface acoustic wave filter 10 according to Embodiment 1 as viewed from the terminal 102. In FIG. 3, reference numeral 2 denotes an impedance characteristic at ~~95~~ 950 MHz in the transmission frequency band. Reference numerals 3 and 4 denote the impedance characteristics of surface acoustic wave filter 10 at 810 MHz and 828 MHz, respectively, as viewed from the terminal 102. FIG. 3 indicates that the phase of the impedance is closer to its open state in the transmission frequency band, whereas the impedances are also matched to each other in the reception frequency band.

LISTING OF THE CLAIMS

1. (Original) A surface acoustic wave filter, comprising:

at least one piezoelectric substrate;

at least one surface acoustic wave resonator formed on said piezoelectric substrate; and

a longitudinal coupled mode type surface acoustic wave filter formed on said piezoelectric substrate,

wherein said surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter are cascaded together,

wherein said surface acoustic wave resonator is also connected to at least one inductor having one end grounded, and

wherein an attenuation band of said at least one surface acoustic wave resonator is apart from a pass band of said longitudinal coupled mode type surface acoustic wave filter in the direction of higher frequencies.

2. (Original) A surface acoustic wave filter, comprising:

at least one piezoelectric substrate;

at least one surface acoustic wave resonator formed on said piezoelectric substrate; and

a longitudinal coupled mode type surface acoustic wave filter formed on said piezoelectric substrate,

wherein different electrode materials are used for said at least one surface acoustic wave resonator and for said longitudinal coupled mode type surface acoustic wave filter, respectively.

3. (Original) The surface acoustic wave filter according to claim 2, wherein the electrode material of said at least one surface acoustic wave resonator has a stronger power durability than the electrode material of said longitudinal coupled mode type surface acoustic wave filter.

4. (Original) The surface acoustic wave filter according to claim 3, wherein said at least one surface acoustic wave resonator has a laminated electrode configuration.

5. (Original) The surface acoustic wave filter according to claim 2, wherein said surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter are cascaded together,

wherein said surface acoustic wave resonator is also connected to at least one inductor having one end grounded.

6. (Original) The surface acoustic wave filter according to claim 5, wherein the attenuation band of said at least one surface acoustic wave resonator is set to be higher than the pass band of said longitudinal coupled mode type surface acoustic wave filter.

7. (Original) The surface acoustic wave filter according to claim 5, wherein the other end of said inductor is connected to a side of said surface acoustic wave resonator which is opposite said longitudinal coupled mode type surface acoustic wave filter.

8. (Original) The surface acoustic wave filter according to claim 7, wherein a plurality of said surface acoustic wave resonators are cascaded together, and

wherein the side of said surface acoustic wave resonator which is opposite the longitudinal coupled mode type surface acoustic wave filter includes connection portions between said plurality of cascaded surface acoustic wave resonators.

9. (Amended) The surface acoustic wave filter according to ~~claim 4 or~~ claim 1 or 5, wherein the other end of said inductor is connected to a connection portion between said surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter.

10. (Original) The surface acoustic wave filter according to claim 8, wherein a plurality of said inductors are provided, and each inductor is connected to said surface acoustic wave resonator through respective different connection portions.

11. (Original) The surface acoustic wave filter according to claim 1 or 5, wherein said inductor moves a phase of an impedance at a frequency of said attenuation band closer to its open state.

12. (Original) The surface acoustic wave filter according to claim 11, wherein said inductor matches impedances at a frequency of said pass band to each other.

13. (Original) The surface acoustic wave filter according to claim 1 or 2, wherein different electrode film thicknesses are used for said at least one surface acoustic wave resonator and for said longitudinal coupled mode type surface acoustic wave filter.

14. (Original) The surface acoustic wave filter according to claim 1 or 2, wherein a plurality of piezoelectric substrates are provided as said at least one piezolectric substrate, and

wherein the piezoelectric substrate on which said at least one surface acoustic wave resonator is formed is different from the piezoelectric substrate on which said longitudinal coupled mode type surface acoustic wave filter is formed.

15. (Original) The surface acoustic wave filter according to claim 14, wherein at least one of said at least one surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter is mounted in a face down manner.

16. (Original) The surface acoustic wave filter according to claim 15, wherein the other of said at least one surface acoustic wave resonator and said longitudinal coupled mode type surface acoustic wave filter is mounted using wires.

17. (Original) The surface acoustic wave filter according to claim 1 or 2, wherein the attenuation band of said surface acoustic wave resonator is a transmission frequency band in a PDC system, and the pass band of said longitudinal coupled mode type surface acoustic wave filter is a reception band in the PDC system.

18. (Original) An antenna duplexer, comprising:

an antenna terminal;

a reception filter connected to said antenna terminal;

a transmission filter connected to said antenna terminal; and

a first phase circuit provided between said antenna terminal and said reception filter and/or a second phase circuit provided between said antenna terminal and said transmission filter, wherein the surface acoustic wave filter according to claim 1 or 2 is used as said reception filter.

19. (Original) The antenna duplexer according to claim 18, wherein all or part of said transmission filter is composed of a surface acoustic wave filter formed on a piezoelectric substrate.

20. (Previously Amended) The antenna duplexer according to claim 19, wherein said transmission filter is formed on the same piezoelectric substrate on which said surface acoustic wave resonator of said surface acoustic wave filter used as said reception filter is formed.

21. (Original) The antenna duplexer according to claim 19, wherein said at least one surface acoustic wave resonator and said transmission filter are mounted on the same package or the same mounting substrate, and said longitudinal coupled mode type surface acoustic wave filter is mounted on a package or mounting substrate different from said package or mounting substrate.

22. (Original) The antenna duplexer according to claim 19, wherein the surface acoustic wave resonator of said surface acoustic wave filter used as said reception filter and said transmission filter are formed on different piezoelectric substrates, and

at least one of said surface acoustic wave resonator and said transmission filter is mounted in a face down manner.

23. (Original) The antenna duplexer according to claim 22, wherein one of said surface acoustic wave resonator and said transmission filter is mounted in a face down manner, and the other is mounted face up for wire connection.

24. (Original) The antenna duplexer according to claim 19, wherein a barrier is provided at a boundary between two areas of the package or mounting substrate on which said surface acoustic wave resonator of said surface acoustic wave filter used as said reception filter and said

transmission filter are mounted, said surface acoustic wave resonator being mounted in one of the areas, said transmission filter being mounted in the other area.

25. (Original) Communication equipment comprising:

an antenna duplexer according to claim 19;

an antenna connected to said antenna duplexer;

transmission means connected to said antenna duplexer of transmitting a signal via said antenna; and

reception means connected to said antenna duplexer of receiving a signal via said antenna.